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# BATS IN YOUR BELFRY?

Bell towers often serve as cozy, if not noisy hangouts for various species of bats, and this seems to have been the source of a rather uncomplimentary expression. But the bats don't cater exclusively to belfries. You could even have them in your attic or in your walls, and this has been the source of much concern to the unhappy hosts. The question that has been posed to the Fish and Game Department is "how do we keep them out of our buildings!" The department doesn't claim expertise in "batology," but some suggestions can be offered.

Some 2,000 different kinds of bats are recognized over the world. Thirteen kinds are, or have been, in Montana, either as transients, as seasonal residents, or as permanent residents. These include: the Little Brown Bat, Yuma Bat, Little Long-eared Bat, California Brown Bat, Long-legged Bat, Say Bat, Fringed Bat, Big Brown Bat, Red Bat, Hoary Bat, Spotted Bat, Townsend's Big-eared Bat, and Silver-haired Bat. The Little Brown Bat, **Myotis lucifugus** is the most common in Montana, and the Spotted Bat, **Euderma maculatum** is the most rare, known only from a single speciment obtained at Billings.

Bats are, indeed, the only mammals which can truly fly. The so-called flying squirrels, flying lemurs, and others can only sail, much like a glider, but the bats in some ways can outfly birds. Perhaps somewhere way back in time the direct ancestors of bats

**The fearsome appearance of bats probably accounts for the many "old wives' tales" about the harmless little creatures. This one is a long-eared bat from Lewis and Clark Caverns.**

**Vern Craig Photo**

**In a grating, clicking voice this long-eared bat registers disgust at being aroused in his winter quarters. Vern Craig, Photo**

were mice-like or shrew-like animals. Over myriads of years their fingers and arm bones have become greatly elongated until finally they serve as a wing structure. A thin, hairless membrane stretched between the bones completes the wing. The highly modified limbs have thus become almost useless for walking, but a claw on the end of each "thumb" helps the animals to crawl.

The saying "blind as a bat" is rather incorrect, for while the eyes are not well enough developed to aid materially during their night flights, they do nonethe-less have vision. The question then arises as to how bats can fly about in the darkness, dodging objects and catching insects or other prey. This was once a mystery, but is now a well established fact that they use what is known as "echolocation." As they fly about they squeak in high-pitched voices—so high that the sound cannot be heard by the human ear. But the sound is audible to the bats, and the echos bouncing off objects are interpreted with great speed and precision. Some of the earlier depth sounders and other navigation instruments were based on this principle. The blind man tapping with a cane employs a similar, though much simplified, technique.

In some experiments, bats were able to flit about a darkened room, avoiding the many silken threats which had been suspended therein. However, when their ears were plugged or their mouths sealed, they blundered into objects repeatedly. One instance of an object apparently attracting, rather than repelling bats, was noted by the author. While fishing in the Missouri River at late dusk one summer's evening, bats flew into a taut, monofilament fishing line with such frequency that it seems improbable the collisions were simply a matter of accident. Bats do make other clicking and screeching noises which are audible to humans, but these apparently are not important to built-in navigation systems.

The ferocity of bats has been much over-emphasized, probably because one of its members, the vampire, does actually feed upon the blood of living animals. They do not make deep punctures and suck blood as commonly believed, but with sharp teeth carefully scrape away the skin and lap the oozing blood. The large flying fox of Malaya, with wingspreads of over four feet, are fruit eaters. Still others feed upon fish, mice, or other small animal life. The ones which we are concerned with in Montana are mouse size or smaller insect-eaters. Scientists tell us that their voracious appetites demand many of the bats to consume more than half of their body weight in insects each night.

The huge quantities of insects consumed by bats make them an ally of man, though they are often feared and misunderstood. They are not commonly infested with vermin as believed. Most species carefully clean themselves with their tongues, or with wetted thumbs where the tongue won't reach. The rich fertilizers taken from beneath bat roosts in Carlsbad and other caverns have contributed somewhat to the economy and agriculture of man. Still, the mouse-like little creatures are much maligned. Few will argue that they're not ugly clear to the bone. Pug noses, large ears, beady eyes, and needle-sharp teeth give them an ogreish look. They are also known to carry rabies. Their presence in dwellings or outbuildings are further dreaded because of the persistent, strong smell left in roost areas.

What can be done then, to keep bats out of buildings, or to get rid of ones which are already undesirable guests. Since the Little Brown Bat is our most common species, this is the one which must most often be contended with. During spring and summer months, the little brown bats roost head down during the daytime in old attics, under bark, behind shutters, in abandoned buildings, in rock crevasses, etc. During the evening and again in early morning, they feed. They will nearly always return before the sun is up. The roost areas have a very persistent odor which may last for a year or more and attract other bats, so the problem is not only to evict the bats, but to make sure there will not be more moving in. The most obvious control measure, and probably the best, is to close all openings so that bats cannot get back to their roost areas.

It's been said, and not entirely in jest, that if you can see daylight through a hole, then a bat can crawl through it. Unscreened louvres and vents, broken windows, gaps about eaves, damaged or worn siding. loose trim, may allow entry to roost areas. The Fish and Wildlife Service recommends bat-proofing in the following way: "The larger openings should be covered with sheet metal or with 1/4 inch mesh hardware cloth if ventilation is necessary. It is essential that no openings larger than 1/4 inch are left. In the case of narrow cracks, they are best plugged with oakum, tow, or similar packing material and sealed with caulking compound. . ."

Care must be taken that all bats are out of attics or house walls before their entries are sealed off. Most will not make roosts in buildings during the winter, for they have rather specific temperature requirements during the long winter months that they cannot find food. The bats which do not migrate must find winter quarters which are above freezing, yet not so warm as to speed up bodily metabolism. If the temperature is below freezing, then the bats must either find better shelter or they will freeze to death. If temperatures are too high, then body metabolism speeds up, body fats are

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consumed, and the bats literally starve. Consequently, nearly all bats will leave buildings and search out caves or go elsewhere for the winter. In their winter quarters they go into deep sleep with slowed breathing and drastically lower body temperatures. Researchers at the Rocky Mountain Laboratory at Hamilton state that soon after the first frosts of autumn the Little Brown Bats have mostly fled their summer roosts and their whereabouts is a mystery. From late fall, then, till early spring is the ideal time to do your batproofing.

If batproofing must be done during summer months, the U.S. Fish and Wildlife Service recommends: "During the normal months when bats are active there are normally two feeding flights, in early evening and very early morning. Normally all occupants leave the roost within 15 to 20 minutes after the first one starts out. If they have been disturbed, however, the normal routine may be upset considerably, and one or two of the most-used openings should be left open temporarily. In the evening, after the last bat has left the roost for feeding, close the remaining openings. If a number of entrances have been used, wait two or three days before attempting to close the last one, allowing all the occupants to learn to enter and leave through this last opening. It can then be closed. . ." There are other more complicated methods of bat eviction or extermination, most of them dealing with toxic substances and their use should be left to professional exterminators.

The lone bat found hanging from screen doors, flopping on the ground, or under other unusual circumstances is to be destroyed. These loners found under unusual conditions are the ones most apt to be rabid. Probably they've gotten sick from consuming insects loaded with insecticides, or from some other cause, but chances should not be taken. If picked up alive they will likely bite, so they should not be handled. If it is necessary to handle them, then heavy gloves should be used. If someone is bitten, the biting specimen should be saved, his head undamaged, and a doctor consulted immediately. The head may be required for brain examination to determine possibility of rabies.

To most of us, however, the bats will remain but faint phantoms of the twilight periods, not to be feared or destroyed.

# Where the Wild Goose Goes

**By Dale Witt**

The somewhat doleful strains of the melody "My heart knows what the wild goose knows . . ." carry a meaning of practical management for game biologists. Most of the geese that nest in Montana during the summer leave for warmer quarters before the advance of winter. Where the wild goose goes when he leaves the "Treasure State" has a direct bearing on waterfowl management and hunting regulations.

The far-ranging habits of geese often compounds problems of their management. One of the first problems is to determine population units. That its, to identify or delineate geese with similar nesting grounds, similar migration routes, similar wintering grounds, and which are harvested in similar areas. The most common way to do this is to band geese throughout their nesting ranges. Both the young and adults are caught during early summer when the young are not yet able to fly. Adults are also flightless at this time because they have molted important wing and tail feathers. The geese are rounded up with boats and herded into traps which have been erected on shore.

**This Canada goose has just been banded with an aluminum band. The bands are numbered and have information as to where they should be sent when recovered.**

After geese are trapped, numbered aluminum bands are placed around their legs just above the feet. A large percent of these bands are ultimately recovered by hunters and by other trapping programs throughout the United States, Mexico and Canada. The story as to where units of geese nest, their main routes to and from wintering grounds and where they spend the winter unfolds as more and more bands are recovered. Over a period of years, the facts of where most of the birds are harvested and their annual losses also come to light. All of this information is important for establishing hunting regulations.

The Canada geese that nest in Montana are separated into five major population units. It is possible that there are two more. As additional information becomes available, these large units may be broken down into even smaller ones. This is particularly true where a portion of the geese in a

**General breeding range, migration routes and wintering areas of Montana Canada geese.**

unit are semi-resident. In other words, some geese may remain in one area the year around. Geese that nest in the Flathead area, fall into this category most years. Also, a portion of the upper Missouri geese in the Ennis area will spend most winters in Montana.

Presently, little is known about the migration distribution of geese nesting on the Yellowstone River. Due to difficulties of banding during high water, no banding has yet been accomplished on this population unit. It is possible that they migrate similar to the Hi-Line unit. This route is the east slope of the Rockies of Wyoming, Colorado and New Mexico. These geese winter in the Rio Grande River Valley, south of Albuquerque, New Mexico and a few go into old Mexico. The geese nesting in the Medicine Lake area migrate southeast into Nebraska and Kansas, while the geese nesting in the east slope area (Freezeout Lake-Cut Bank) migrate south to eastern Idaho, with some going to Nevada and California.

When Canada geese have established a migration pattern they adhere to it quite strongly and often return to the same nest site to nest. The characteristics of these population distributions do change from time to time, however. Usually when major shifts in migration routes and concentrations occur they are brought about by a major change in habitat conditions, such as a prolonged drought that affects food and water. Concentrations and migrations have been affected during recent years in some states by creation of ideal food and water conditions coupled with closure of the areas to hunting for a period of time. Sometimes, several years are required to effect a change in the migration pattern. In a few instances, large populations of geese have been short-stopped or influenced to winter further north in the flyway by this technique.

By monitoring band recovery records, changes in migration patterns can be detected. If alterations in hunting regulations are desired they can be made to best advantage of both the resource and sportsmen.

In most instances, the sport of goose hunting is of higher quality if the distribution of geese and harvest is widespread. This means that the creation of situations that attract large concentrations of birds where one or two harvest areas account for the majority of the harvest in the flyway must be avoided.

It is important to game workers that they not only recognize major waterfowl units, but also that they detect any major shifts in migration routes and harvest areas. By systematic, annual banding programs we will continue to know where the wild goose goes.

# Fisher in Montana

Lewis and Clark called it a "Black Fox," the Abenaki Indians and early French settlers called it "Pekan," and today we know the animal as a fisher. More specifically, this large member of the weasel family is **Martes pennanti**. The name fisher is somewhat misleading, for to many people it implies that this is a water-oriented animal which it is not. It has been speculated that the animal earned the name because of its reputation for robbing traps, traps which were baited with fish.

An adult fisher is about the size of a large cat, or small fox. Males may run near 40" long from nose to tip of tail with the tail making up a little over 1/3 of the entire length. Males may weigh 8-12 pounds. Females are considerably smaller on the average.

Fisher are dwellers of coniferous forests. Their original range appears to have been in the pine and spruce areas from northern Canada near the Great Slave Lake, south through the Allegheny Mountains to South Carolina, through the Rockies into southern Wyoming, and through the Cascades and coastal mountains to central California. These mammals appear to be characterized by violent ups and down in population numbers. Such fluctuations are typical of predators depending upon small animals which also have violent ups and downs in their population numbers. Researchers feel that they probably never were an abundant animal, relatively speaking.

**It's said that the mark of a good tree climber is the ability to come down head first. This the fisher can do with ease.**

**Photo by Vernon Hawley**

Because fisher have never been an abundant animal, their pelts have nearly always demanded a good price. In Montreal, March 1920, fur sale reports show 1,393 fisher offered for a total value of $206,476.00. The lowest price pelt brought $20.00, and the highest was $345.00. There are much cheaper prices listed for other sales, however. In "Men and Trade of the Northwest Frontier," the Ft. Owen Ledger is reported as listing a fisher skin at 75 cents but nothing is stated as to the condition of the pelt. From "Furbearing Mammals of California," prices are reported as follows: The average price received by the trapper for a California fisher pelt was $67.33 in 1920, $12.00 in 1921, $39.20 in 1922, $49.67 in 1923, and $56.02 in 1924.

Food of the fisher is primarily small animals, including mice, tree squirrels, rabbits, and occasionally its near relative, the marten. Carrion is eaten and even berries may be taken when preferred foods are hard to come by. Fisher are one of the few species which successfully preys on porcupines. A hapless "porky" once upended is attacked and eaten out through his unquilled belly area. Much has been written about the fisher's ability to make a meal of the well-armed porcupine. Just what effects the quills themselves may have upon digestive organs of the fisher is an unresolved argument of longstanding. Some vow that the quills pass through the fisher with little more than a tickle, while others have found quills imbedded in the intestinal tract and consider that they could eventually cause death. Richard Weckwerth states that several which were returned to the Montana Fish & Game Department had quills imbedded in their hides. The imbedded quills did not seem to be infected.

Young of the fisher are born from March through April in litters of one to five. Development of the young is accompanied by a phenomenon known as "delayed implantation," in which development of the embroyos ceases at a certain stage and does not start again for several weeks. In other words, the period of gestation for fisher is about 50 weeks, but there is not continuous development of embroyos during the entire period.

Fisher were native to at least western Montana, but investigations by Montana Fish and Game research workers strongly point to the disappearance of fisher from Montana during the 1920's. Because of its value as a furbearer, the Fish and Game Commission was anxious to reestablish this animal in western Montana. Because of its habit of preying upon porcupines, the Forest Service also looked favorably on the return of fisher to Montana. As reported by Richard Weckweth, biologist for the Montana Fish and Game Department, and Dr. Phillip Wright, University of Montana, "Live trapped fishers were caught by commercial trappers in central British Columbia and imported to Montana. The first transplant of nine fishers was made in the Pink Creek drainage

General locations of fisher transplants and recoveries.

of Lincoln county during March, 1959. The second release of 15 was near Holland Lake, Missoula county during April, 1959 and January, 1960. The third release of 12 was at Moose Lake, Granite county, during February, 1960."

Before fisher were released, the sex of each was determined, they were aged, ear-tagged, and tattooed. Areas into which the fisher were planted were closed to marten trapping for a period of five years to help protect the transplanted animals.

By 1966, two of the planted males and five of the planted female fisher that had fallen to traps set for mink, wolverine, bobcats, and lynx, were turned in to the Fish and Game Department. One fisher had traveled at least 64 miles from the site where he was released. The seven marked fisher represented a 19 per cent catch of the released fisher, from a lightly trapped area. Weckworth and Wright consider this as an indication that the fisher are vulnerable to traps and should receive maximum protection after transplanting. In addition to the tagged animals, 14 untagged fishers have been recorded in Montana since 1959. These are believed to be the progeny of released fisher.

The future of fisher in Montana is pretty much of a question mark. Perhaps they will again shrink before whatever factors caused them to disappear from native haunts of Montana and elsewhere. Perhaps too, with an improved knowledge of their ecology, and with proper management they will persist in the great expanses of western Montana forests.

# Management of Elk in the Little Belt Mountains

**By Jim Mitchell**

In the Little Belt Mountains near the center of Montana dwells one of the state's finest elk herds. The Little Belts are an isolated mountain range separated from the Big Belt Mountains by the Smith River and from the Continental Divide by the Smith and Missouri rivers. The importance of this thriving elk herd to Montanans is enhanced by its proximity to the state's two heaviest population centers, Great Falls and Billings. Hunters in either of these cities can leave their homes early in the morning and be hunting elk in the Belts at daylight the same day.

Although the total herd is not large when compared to others around the state, such as the Sun River and the Yellowstone Park herds, its location and high productivity make it one of the most important in the state.

For many years the elk that inhabited the Little Belt Mountain Range were treated as one group, exclusive of the elk that spend the winter months near Harlowton. As a result of several years of elk marking on the Judith River Game Range near Utica and noting where hunters harvested these elk, it was determined there were at least two major elk herds within the Little Belts, with U.S. Highway No. 89 as a definite boundary between the two. The majority of the elk in the Little Belts winter on the Montana Fish and Game Department owned game range near Utica with the next largest number wintering along the Smith River near Millegan. Of approximately 90 tag returns from elk tagged on the Judith River Game Range, only one was returned from west of U.S. Highway No. 89.

Also discovered was the alarming fact that the area east of U.S. Highway No. 89 where most of the elk in the Little Belts spend the four seasons, was quite accessible to hunters and becoming more so all the time. Newly constructed or proposed U.S. Forest Service logging roads into the area, added to the existing roads and trails, were the source of concern. The elk were vulnerable to hunters from a quite complete system of vehicle roads that in many localities traversed both the tops of the ridges and the bottoms of the draws. At best, the elk were only a few short miles from some road. Also, when the weather is bad the elk that normally winter on the Game Range near Utica concentrate in the accessible area and become even more vulnernerable.

From 1957 through 1966, with the exception of one bull elk season, one to three day either-sex elk seasons were established in most of the Little Belts. A poor "shake-of-t h e-dice" by Mother Nature and her weather could have resulted in a heavy kill of the base herd. Fortunately, there were never any excessive harvests over these years.

To throw the odds in the elks' favor and lower chances of an over-harvest of femals, the Montana Fish and Game Commission split nearly all of the Little Belt Mountains (Hunting District 48) into two parts during 1967. They also initiated an either sex permit system in the portion of former district 48 lying east of U.S. Highway No. 89 between Armington junction and White Sulphur Springs. A concurrent general bull season was run to provide hunting for persons who were not lucky in drawing either sex elk permits.

Because of the more rugged terrain between U.S. Highway No. 89 and the Smith River (now Hunting District 413) a short either-sex season followed by a general bull season was continued there. As more data is gathered on this segment of the Little Belts elk, more refined management techniques will undoubtedly have to be initiated. There are both spring and winter range problems for the elk in this area due to competition on private land. These problems will have to be worked out through controlled harvests. This also holds true for the other smaller groups of elk wintering around the Little Belts. Their numbers will have to be held to a point compatible with adjacent land uses so they are not causing damage to private land owners.

In 1967, 300 either-sex permits were issued in the portion of the Little Belts east of U.S. Highway No. 89. The number of permits issued based on available data was designed to maintain approximately the present herd size. However, it was found that only 30 percent of the permit holders who hunted got an elk, rather than an anticipated 50 percent. This is due to the fact that the drawing was from statewide rather than just local applicants. Thus, to hold the elk herd at approximately its present size, 200 additional either-sex permits will be issued in 1968. Also, 100 alternate either-sex permits may be validated after the regular season is over to control elk use of private property, should it occur as it has in past years.

To reduce the chances of getting too large a harvest, should a majority of the 500 permittees show up near the Game Range coincident with some harsh weather, the 500 permits were split into two hunting periods. The first 250 permitees may hunt from October 27 through November 13 and the remaining 250 may hunt the remainder of the season.

Data collected on range condition and forage use on the Judith River Game Range for the past several years shows the range condition has remained stable or improved and average annual use of the forage by the elk has not been excessive. Also, several old agricultural areas on the Game Range that were once seeded to exotic grasses and which are not used by the elk are being reworked and will be reseeded with native grasses. Those areas should eventually help provide more forage for the elk than is presently available for winter use.

Of course, the ultimate size of the elk herd using the Game Range will be determined by the season, or seasons, of the year when the elk have their shortest forage supplies.

Instead of the winter food shortage common to most elk, the segment of the Little Belt Mountains elk herd utilizing the Judith River Game Range for winter forage apparently has spring and fall range problems. The problem stems from the fact many of the elk from the Game Range move into the confines of the upper Middle Fork of the Judith River where there is a sizeable portion of private land, where livestock are grazed, encompassed within the boundary of the national forest.

This problem is currently under study through the combined efforts of the Montana Fish and Game Department and U.S. Forest Service. The ultimate goal of this study will be to come up with animal use priorities on the national forest lands involved in the Upper Middle Fork, as well as the closely associated upper Lost Fork, which is entirely U.S. Forest Service land. The areas on the upper reaches of these drainages consist primarily of native-grass meadows along the creek bottoms with timber on the fairly steep adjacent slopes.

The importance of the Utica Game Range to elk in the eastern portion of the Little Belt Mountains is illustrated by the fact the number of wintering elk on the range over the past 10 years has increased markedly, while the elk numbers in the area near the Game Range and in the Little Belt Mountains as a whole have not increased proportionately. From an aerial count in 1958, it was determined at that time approximately 50 percent of the elk seen east of U.S. Highway No. 89, exclusive of Hunting District 54, were actually on the Game Range. In 1968, all of the elk seen in that portion of the mountains at the time of the count were on the Game Range. It is quite evident that the Game Range is serving its purpose and supplying by far the greatest majority of the elk in the area forage during the critical winter period. Elk are large, mobile animals and can cover a lot of country in short periods of time. Thus, as weather changes the elk may move onto the national forest and some that use the Game Range in winter stray onto adjoining private land. However, excessive use of private lands can be remedied for the most part through regular and special post season hunts.

There will undoubtedly be some yearly fluctuations in harvest with the permit system. Weather, for example, will be an influencing factor. However, the possibility of over-harvest certainly won't be as great as during previous seasons when all hunters were able to shoot either sex elk.

This herd appears to be as nearly in balance with year around forage supplies and adjacent private land uses as any in the state. Records show that it is near the top in the state as far as reproduction is concerned. For the past 10 years, the herd associated with the Game Range has averaged 53 calves per 100 cows. When this ratio is compared to those from the Sun and Flathead River areas (20-30 calves/100 cows normally), the healthy condition of the Little Belts elk is obvious. The better the production, the more elk available to sportsmen. With lower production, there is obviously "dead weight" in the herd.

From all appearances, the sportsmen of Montana can be duly proud of the thriving elk herd located near the heart of our state.

# MONTANA
# FISH AND GAME DEPARTMENT

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